

In re Patent Application of:
ALLEN ET AL
Serial No. 10/801,995
Filed: MARCH 16, 2004

IN THE CLAIMS:

1. (currently amended) A boom structure that is deployable from a collapsed, stowable configuration to an elongated truss configuration, comprising a plurality of truss-forming multi-sided bays, a respective one of which contains a pair of battens joined together at corresponding corner regions thereof by foldable longerons therebetween, and wherein a respective side of a bay contains a plurality of diagonal cord members crossing one another and connected to diagonally opposed corner regions of said respective side, such that when said foldable longerons are in their folded positions, said battens are nested together against one another in a stacked arrangement and said diagonal cord members flex into a compact stowed configuration between adjacent battens; and wherein

a corner region of a batten includes clamping members that are configured to engage an elongated structural tube in the stowed configuration of said boom structure and, in the course of deployment of said boom structure outwardly from its stowed configuration, said clamping members travel along and leave said elongated structural tube, and engage threads of an elongated threaded shaft that is coaxial with and extends outwardly from said elongated structural tube.

Claim 2 (cancelled).

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3. (currently amended) The boom structure according to claim [[2]]1, wherein said elongated threaded shaft comprises an elevator screw that is coaxial with an elongated lead screw, said elongated lead screw passing through said elongated structural tube, such that rotation of said elongated lead screw causes linear travel of said elevator screw over a prescribed distance, sufficient to deploy one bay of said boom structure, whereupon said elongated lead screw becomes fixedly engaged with said elevator screw, so that further rotation of said elongated lead screw causes rotation of said elevator screw therewith, and clamping members that engage said elevator screw travel along therealong until they leave said elevator screw in the course of deployment of a respective bay of said boom structure.

4. (original) The boom structure according to claim 3, further comprising a drive motor and a gearing and interconnect arrangement retained by a baseplate from which elongated structural tubes extend, said gearing and interconnect arrangement engaging an output shaft of said drive motor and respective lead screws that pass through said battens, whereby operation of said motor drives said gearing and interconnect arrangement so as to cause rotation of said lead screws and said elevator screws engaged thereby, and sequentially deploy successively adjacent bays of said boom structure.

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5. (original) A space-deployable, elongated truss structure comprising:

a base member from which extend a plurality of spaced apart elongated structural tubes, each elongated structural tube containing an elevator screw extendable therefrom;

a plurality of truss-forming multi-sided bays, supported by said elongated structural tubes, and being coupled to elevator screws extending from said elongated structural tubes, a respective bay containing a pair of battens joined together at corresponding corner regions thereof by foldable longerons therebetween, such that when said foldable longerons are in their folded positions, said battens are nested together against one another in a stacked arrangement along said elongated structural tubes; and

a drive motor coupled to simultaneously drive each elevator screw, so as to sequentially deploy said plurality of truss-forming multi-sided bays.

6. (original) The space-deployable, elongated truss structure according to claim 5, wherein a corner region of a batten includes clamping members that are configured to engage said elongated structural tubes in the stowed configuration of said boom structure and, in the course of deployment of said boom structure outwardly from its stowed configuration, said clamping members travel along and leave said elongated structural tubes, and engage threads of said elevator screw.

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7. (original) The space-deployable, elongated truss structure according to claim 6, wherein said elevator screw is coaxial with an elongated lead screw, said elongated lead screw passing through said elongated structural tube, such that rotation of said elongated lead screw causes linear travel of said elevator screw over a prescribed distance, sufficient to deploy one bay of said boom structure, whereupon said elongated lead screw becomes fixedly engaged with said elevator screw, so that further rotation of said elongated lead screw causes rotation of said elevator screw therewith, and clamping members that engage said elevator screw travel along therealong until they leave said elevator screw in the course of deployment of a respective bay of said boom structure.

8. (original) The space-deployable, elongated truss structure according to claim 5, wherein a respective side of a bay contains a plurality of diagonal cord members crossing one another and connected to diagonally opposed corner regions of said respective side, such that when said foldable longerons are in their folded positions, said battens are nested together against one another in a stacked arrangement and said diagonal cord members flex into a compact stowed configuration between adjacent battens.

9. (original) The space-deployable, elongated truss structure according to claim 5, further comprising cup cone members that allow compression of adjacent bay corners together to

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form a load carrying structure when stowed capable of reacting it's own inertial loads and those dumped into the stowed structure at each of its battens.

10. (original) The space-deployable, elongated truss structure according to claim 5, which is adapted to allow for attachment of payloads to each bay in all configurations, stowed, deploying and deployed.

11. (original) The space-deployable, elongated truss structure according to claim 5, wherein all preloaded elements are effective to eliminate a dead band within the deployed structure.

12. (original) The space-deployable, elongated truss structure according to claim 5, that is configured to undergo no rotation in any fashion about its axial centerline during deployment.

13. (original) The space-deployable, elongated truss structure according to claim 5, wherein the base of the truss is mounted directly to said base member without moving tables or lazy susans therebetween.

14. (original) A method of deploying a boom structure comprising the steps of:

(a) providing a plurality of truss-forming, multi-sided bays, a respective bay containing a pair of battens joined

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together by foldable longerons therebetween, and wherein a respective side of a bay contains a plurality of diagonal cord members crossing one another and connected to diagonally opposed corner regions of said respective side, such that when said foldable longerons are in their folded positions, said battens are nested together against one another in a stacked arrangement and said diagonal cord members flex into a compact stowed configuration between adjacent battens;

(b) nesting said plurality of truss-forming, multi-sided bays in a stacked arrangement along elongated support members; and

(c) sequentially translating said plurality of truss-forming, multi-sided bays away from said stacked arrangement and off said elongated support members, so as to sequentially deploy said plurality of truss-forming multi-sided bays.

15. (original) The method according to claim 14, wherein a corner region of a batten includes clamping members that are configured to engage an elongated structural tube in the stowed configuration of said boom structure and, in the course of deployment of said boom structure in step (c) outwardly from its stowed configuration, said clamping members travel along and leave said elongated structural tube, and engage threads of an elongated threaded shaft that is coaxial with and extends outwardly from said elongated structural tube.

16. (original) The method according to claim 15, wherein said elongated threaded shaft comprises an elevator screw that is

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coaxial with an elongated lead screw, said elongated lead screw passing through said elongated structural tube, such that rotation of said elongated lead screw causes linear travel of said elevator screw over a prescribed distance, sufficient to deploy one bay of said boom structure, whereupon said elongated lead screw becomes fixedly engaged with said elevator screw, so that further rotation of said elongated lead screw causes rotation of said elevator screw therewith, and clamping members that engage said elevator screw travel along therealong until they leave said elevator screw in the course of deployment of a respective bay of said boom structure.

17. (original) The method according to claim 16, wherein step (c) comprises coupling the output shaft of a drive motor to respective lead screws that pass through said battens, and operating said drive motor so as to cause rotation of said lead screws and said elevator screws engaged thereby, and sequentially deploy successively adjacent bays of said boom structure.